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VOL. IX. No. 6 APRIL, 1916

TRANSACTIONS

OF THE

SOCIETY OF TROPICAL MEDICINE AND HYGIENE.

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VOLUME IX. No. 6.

Proceedings of a Meeting of the Society held on Friday, March 17th, 1916, at 5.30 p.m., at 11, Chandos Street, Cavendish Square, W., Mr. J. CANTLIE, in the Chair.

EXPERIENCES IN THE TREATMENT OF SYPHILIS IN THE ARMY, WITH SPECIAL REFERENCE TO THE ADMINISTRATION OF "606" IN CONCENTRATED SOLUTIONS.

BY

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These experiences in the treatment of syphilis may be presented in the form of a report on the work done at the Connaught Hospital, Aldershot, from 6th September, 1914, to 31st December, 1915.

The cases treated in the venereal division were drawn from the whole of the Aldershot Command, and also from the Front, with occasional transfers from other Commands.

During the period above mentioned, there were treated:—

Syphilis (new admissions)	1084
„ (transfers)	89
Gonorrhœa	3096
Venereal Sores	124
Skin and Scabies cases	2907

Regarding the cases of syphilis, it will be seen from the above figures that they are practically all from the troops actually in the Aldershot Command. Among those admitted under heading "new admissions" were a number of cases of what we call "old syphilis." These we consider to be "old cases" where the disease had been acquired more than twelve months prior to admission.

They represented 17·7 per cent. of the total new cases.

The "old cases" comprised many old infections in men who had previously been soldiers, and who had received a considerable amount of treatment in past years, while in the regular Army. Most of these men declared that they had been free of all symptoms while in civil life, but that the stress and strain of training caused them to break down again.

On making enquiries of these men as to the health of their families, we elicited the statements from most of them that during their years of civil life they had married, and their families were healthy. Occasionally one would admit that abortions had occurred, but the most held to the statements about healthy children having been born to them.

The transfers from other Commands amounted to about 8 per cent.

The districts of the country in which the infections were acquired was carefully inquired into, and it was found that the disease had been got in practically all parts of the United Kingdom and Ireland, Canada, France, India, etc. The largest number of cases came from the following towns: London, Dublin, Glasgow, Newcastle. Of these, London was the greatest focus of infection.

It is interesting to note here that the cases of infection acquired in the Aldershot Command represented only 4·2 per cent. of the total admissions for syphilis.

All cases of syphilis when diagnosed were treated in hospital and kept in hospital until they were free from active manifestations, such as unhealed sores on the genitals, condylomata at anus, mucous patches in the mouth and throat. The average stay in hospital to accomplish this was 15·5 days.

On leaving hospital, all patients had to attend weekly for their mercurial and other injections, according to the scheme of treatment in vogue at the time.

During this period of treatment inside hospital and also as out-patients, careful attention is paid to the general condition of the patients

as regards weight, appearance of the gums, any onset of anæmia, and the care of the teeth. The urine is also examined periodically.

The sites of the primary lesions in this series of cases were in the following order of frequency :—

1. Most common : Sulcus of penis, *i.e.*, at junction of the foreskin mucous membrane with that of body of penis.
2. Next most common : On the glans penis itself.
3. Least common : On the body of penis.
4. Rarest : Extra-genital chancres on finger, lip, tongue, eyelid, anus.

The lesions which were noted in the diagnosis of the cases occurred in their relative frequency as noted just below, and, of course, their sequence depended on the length of time since infection and whether any treatment had been given.

1. Hunterian chancre.
2. Glands—enlargement and shottiness in glands of groin, neck and elbow.
3. Skin rashes.
4. Mucous patches in mouth and throat.
5. Headache and alopecia.

In practically all the new cases of syphilis a definite Hunterian chancre, an elevated indurated ulcerated sore, was easily demonstrated, and great clinical attention and importance was paid to the hard indiarubber induration on grasping the lesion between the forefinger and thumb. No ordinary ulcer or any soft sore uncomplicated with syphilis gives this indiarubber feeling on palpation.

The presence of headaches was always enquired into very carefully, and brought out the information that 14·7 per cent. of all cases had definite headaches. These headaches were mostly nocturnal, although a few men complained of marked diurnal headaches. They were mostly of an ill-defined character and not located to any one part of the head. The men described them as "a general pain all over the head." A few cases were definitely located as "vertical" or "frontal." All these men stated that after their first injection of "606" the headaches cleared off, and they had no further trouble with them.

The diagnosis in most of the cases was obvious from an ordinary clinical examination, and the aids of the microscope and serum test were

quite unnecessary, and for quite a while the serum test was unobtainable, owing to war conditions, for such a number of cases. In some cases we demonstrated the presence of the *Treponema pallidum* in the sores by means of dark ground illumination, and also had blood tests done at Rochester Row Military Hospital.

As regards the clinical examination and diagnosis, the following points were most carefully enquired into:—

1. The interval which had elapsed between the exposure to infection and the first appearance of the sore. This, of course, was complicated when several exposures at varying times were admitted by the patient.

2. The persistence of a sore or ulcer on the penis in spite of the usual treatment by cleanliness and ordinary antiseptics. When a sore not definitely syphilitic did not heal up in a few days it was regarded with suspicion and more extensive enquiries made.

3. The hardness of the primary lesion. The dense india-rubber or cartilaginous feeling when the sore is grasped. It has aptly been represented as a button or piece of india-rubber let into the tissue. In primary lesions underneath the foreskin, the peculiar manner in which the foreskin rolls back with a sort of elevated collar is typical.

4. The enlargement and shottiness of the glands in the groin on both sides, and the early involvement of the glands in the neck and the epitrochlear glands in both arms. These discreet shotty glands are not tender, do not tend to suppurate, and are not tied down by adhesions unless some septic complication has set in.

5. Secondary rashes on the skin, lesions in the mucous membrane of the mouth and throat, and condylomata, alopecia, etc.

In no case did we get any iritis or eye complications, either at admission or later on.

In most of the old cases, even when the disease had been contracted from 8 to 20 years before, enlargement and shottiness of the glands could be demonstrated. The scars of the original sores on the penis were quite visible and were valuable guides to diagnosis.

One valuable point in the diagnosis of any condition which can be regarded as secondary syphilis is that we have never found any one clinical condition, such as skin infiltration, or affection of mucous membrane or bones, without accompanying enlargement of the glands of the neck, groin, and elbow. These are invariably carefully felt for, in addition to other enquiries as to history of original disease, looking for scars, etc.

In the Connaught Hospital, the first injection of Hg. is always given just before the "606" injection. This ensures that the patient need not be disturbed should he be suffering from a marked reaction after the "606."

Prior to the injection of "606" no special preparation of the patient is considered necessary, but no patient is allowed to have a heavy meal for several hours before.

We do not find that a small amount of albumen in the urine, as shewn by the cold nitric test, is a bar to the injection of "606" or kharsivan. When the amount is at all large, the "606" is withheld for a week or two, and the patient is treated with mercury. A further examination of the urine then usually reveals a great improvement in the amount of albumen and the "606" is given.

A number of men whose urine did not clear up satisfactorily, and whose appearance did not indicate any advanced renal disease, were given the full dose of "606," even although the urine was loaded with albumen. The urine invariably cleared up after this treatment, indicating that the albumen was of syphilitic origin.

COURSE OF TREATMENT.

One complete course of treatment was given to each case where they were not removed from the Command. After one such course a case was considered "fit for Active Service," as he had no active signs and was unlikely to need more treatment for several months or a year.

During the period of treatment only 2·3 per cent. of all the cases treated needed to be readmitted for hospital treatment, the necessity for such being due to patches occurring in the mouth, probably due to excessive smoking, sore gums from too much Hg., or neglecting to keep teeth clean, or, as happened in a few cases, the original primary lesion broke down once more after having completely healed up.

TECHNIQUE OF PREPARATION OF THE SOLUTIONS OF THE ARSENICAL PREPARATIONS.

1. For neo-salvarsan or neo-kharsivan. All that is necessary is to boil some ordinary tap water, then take 10 c.c. of this at 60° F. and shake in the contents of the neo-salvarsan or neo-kharsivan bulb. It readily dissolves in the water.

2. For salvarsan or kharsivan. The usual procedure is to dissolve them in sterile distilled water saline made by dissolving 8·5 grammes of pure sodium chloride in one litre of sterile freshly distilled water. We take 100 c.c. of this saline solution and dissolve the contents of the "606" bulb in it by shaking it up in a bottle with 50 small glass beads.

This dissolved solution is then neutralized with 4 per cent. sodium hydrate solution, and we find that from 4·2 c.c. to 4·8 c.c. of the sod. hyd. solution is needed to just cause the precipitate to be redissolved. Then the bulk is made up with sterile saline solution to 250 c.c.

Owing to the lack of distilled water, due to the distilling apparatus being out of order and from the fact that boiled tap water could be used for neo-salvarsan, I finally came to the conclusion that saline prepared from boiled tap water might be used for the preparation of the kharsivan solution. Quantities of plain tap water are boiled and put in a large sterile glass jar, where a certain amount of lime is deposited when the water cools. The clear water is syphoned off, made into saline, and again boiled; it is then filtered through sterile gauze to get rid of the further lime salts deposited. It is now ready for use as a solvent for the kharsivan.

In practice abroad in the tropics, when I could not get distilled water I have used clean rain water off a new galvanized iron roof, boiled, made into saline, and used as a solvent.

No untoward results have occurred from the use of rain water or boiled tap water. To many men in out-of-the-way parts of the tropics this hint may prove of much use.

TECHNIQUE OF INJECTIONS.

When the patient is ready for the "606" injection, he is laid on the operating-table and the bend of the elbow is painted with a solution of iodine, 15 per cent. solid, in chloroform. Dissolving the iodine in

chloroform is recommended as the latter drug quickly penetrates the fatty material in the skin. A tourniquet consisting of a piece of rubber tubing is put round the upper arm, midway between the shoulder and the elbow; one turn only is required, and the ends are left (*vide Fig. 1*) so that it can be pulled off in one motion. He is then instructed to open and close his fist slowly, so as to cause the superficial veins to fill up.

Most of our patients have large outstanding veins which present no difficulty in puncturing, but occasionally one meets, especially in stout men, flabby fat arms with small veins which will not swell up by opening and closing the fist.

Several plans have been devised to distend these veins. One may direct the patient to stand up and swing the arm round the head several times, then stoop down while the tourniquet is being applied. Or, again, one may let the arm be held under the hot-water tap for several minutes prior to putting on the tourniquet. When these measures fail one has to put on the tubing tourniquet high up near the shoulder, and put on a few turns of an Esmarch bandage from the shoulder down and from the fingers upwards; this always pushes enough blood into the elbow veins to distend them. So far, in our experience, we have never had to cut down to expose the vein for puncturing.

For sterilization, all the apparatus has been boiled and the needles kept in 90 per cent. alcohol.

When the prominent veins at the elbow are distended, the operator picks up the skin over the largest vein and rapidly introduces the needle under the skin alone. The skin is then let down on the vein, and in turn the vein is entered by elevating the base of the needle, pressing the point against the top of the vein, and the needle slips in. *(Fig. 1.)*

As soon as the operator feels that the vein is punctured, he loosens the tourniquet by giving the long end one pull, and immediately turns on the saline, or, when giving small injections, presses the piston of the syringe and forces the solution into the vein.

Should the needle, by any mishap, have left the vein or gone through the wall on the other side, one sees the skin begin to elevate from the pressure of fluid underneath. If this occurs, the needle must be at once withdrawn and a fresh puncture made.

When the quantity of the solution is from 50 c.c. to 250 c.c, it is

always run in by gravity from the apparatus shewn. *(Fig. 2.)* When the medium is smaller than 50 c.c., it is put direct into the vein by means of a "Record Syringe." In this latter case it is advisable to put the needle into the vein by itself, make sure that it is in the vein by seeing blood run out of the base of the needle, and immediately fit on the syringe and inject.

When the larger solutions are to be run in by gravity, a small quantity of saline solution is first allowed to run into the vein: should this run freely the saline is turned off, the "606" solution turned on, and then, when the latter has run down to the Y-shaped tube, the saline is again turned on to wash any solution remaining in the lower tube into the vein, then when the lower "window" in the injecting tube shews clear saline solution only, the clip is shut. The needle is withdrawn now, a pad of sterile lint is placed on the puncture, the arm is raised up vertically to stop any bleeding from the vein and a collodion dressing is applied. *(Fig. 3.)*

After holding the arm up above the head for a few minutes the patient proceeds to bed.

These injections are usually done in the forenoon and the reaction and temperature noted during the rest of that day and the following. The temperatures are taken at 9 a.m., 3 p.m., and 9 p.m. Men attending from outside for "606" injections remain in hospital for four hours after. If, then they shew no marked reaction they are allowed to rejoin their unit.

The total number of injections of salvarsan, neo-salvarsan, kharsivan, and neo-kharsivan given during the period were 2,095.

For the mercurial injections, all the syringes (all glass) and platino-iridium needles are sterilized in hot olive oil at 180° C.

A small nickel capsule full of olive oil is kept over a spirit-lamp or a bunsen flame. If necessary a thermometer is kept in this, but for all practical purposes, if the oil is heated until it just smokes, that means that its temperature is roughly about 180° C.

This way of sterilizing the needles and syringe is the most satisfactory, for the oil at this temperature will kill all living organisms, it also mixes perfectly with the grey oil, and, in addition, when sucked up in the syringe after the injection is over, it cleanses the needle from all particles of mercurial cream. In doing a series of cases it is not

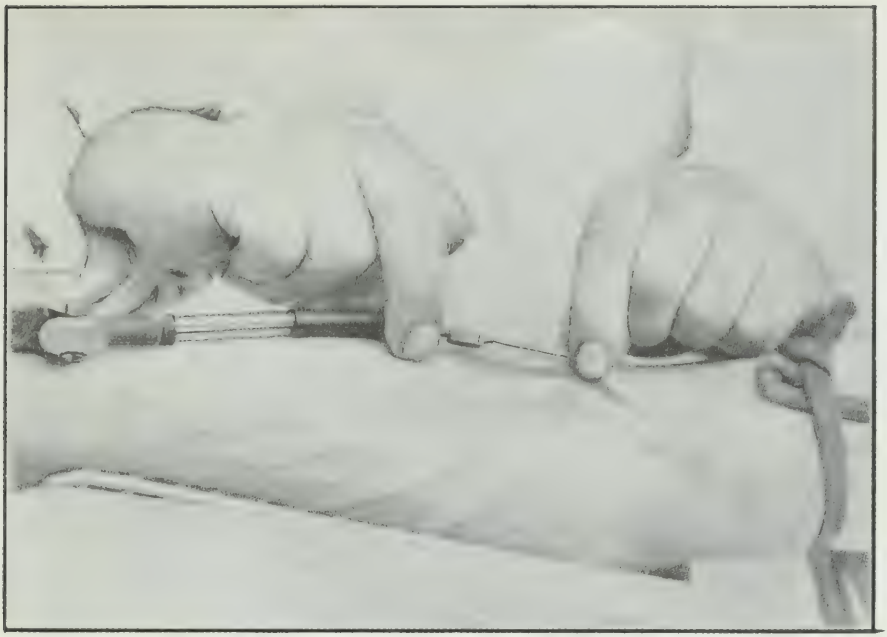


Fig. 1.

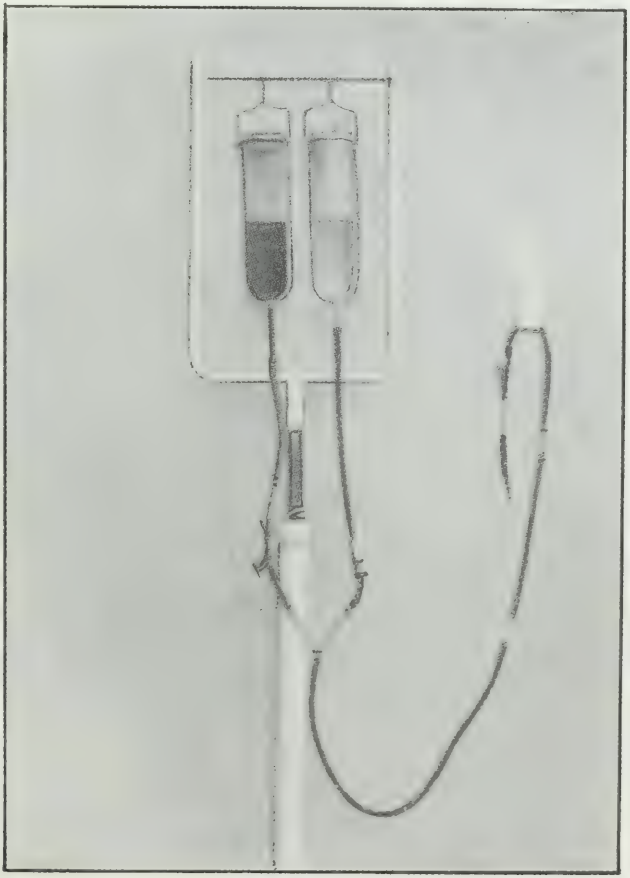


Fig. 2.

Illustrations to accompany Capt. H. J. McGrigor's Paper.

Fig. 3.

Fig. 4.

Illustrations to accompany Capt. H. J. McGrigor's Paper.

necessary to sterilize the whole syringe for each case. It is sufficient to dip the needle into the hot oil between each injection to ensure that no infection in the needle remains alive.

On very few occasions indeed have we had any abscess formation occur, and only seldom do we have any painful thickening at the seat of injection. At this point I must impress the fact that if the injection is not made deeply into the muscle, there is a great tendency towards the formation of painful thickenings, especially if the injection be made into the fat and subcutaneous tissue only

The materials being ready, a point on the buttock, about midway between the post superior spine of the ilium and the top of the great trochanter of the femur, is painted over with the solution of iodine, 15 per cent., in chloroform *(Fig. 4.)*. Then with a quick vertical plunge the needle is inserted at right angles to the surface and down into the muscle. The injection of 1 gr. of metallic mercury for an average-sized man once a week is found to be quite sufficient mercurial treatment.

During the period under discussion, 5,168 mercurial injections have been given.

All patients are warned as to the necessity of keeping their teeth clean, and to report any soreness of the gums at once. Where men have allowed their teeth to get into a dirty state with tartar and debris between them, they are set to work with pointed matches, cotton wool and finely-powdered pumice-stone to get them reasonably clean.

It has been the experience in this hospital that men who keep their teeth clean seldom suffer from soreness of the gums during their treatment.

Occasionally one comes across patients who have, or profess to have, conscientious objections to injection of any kind, or object to the same through ignorance or fear. In these cases, as one cannot compel them to submit to an injection, which is considered to be an operation, they are put on a course of inunction. In this method they have a daily rubbing of 30 grains of ung. hydrag. continued for a period of six weeks. The irksomeness of this method of treatment usually overcomes the objection to injection which was originally entertained.

Owing to the well-known fact that the injections of the arsenical compounds alone do not ensure a cure of syphilis, various combinations of arsenical and mercurial injections have been adopted. For a time

we gave 1 "606," then 9 Hg., followed by 1 "606." Then we tried 1 "606," 2 Hg., 1 "606," 2 Hg., 1 "606," and 1 Hg.

This latter method has the advantage of being completed in one month, while the former method takes nine weeks. I understand that Major FRENCH, O.C., Military Hospital, Rochester Row, favours the nine weekly injections of Hg. as shewing the better results.

LOCAL TREATMENT OF SYPHILITIC LESIONS.

The primary sore is kept clean by frequent washing with mercuric chloride solution (1/1,000). If foul to start with, it is cleaned by the application of petrol or ether; then a small piece of sterile lint wrung out of mercuric lotion (1/1,000) is applied.

In most cases this local treatment is sufficient. Cases which shew any delay in the healing process are treated by means of cataphoresis. Here a current of 10 milli-ampères for ten minutes is used, the positive pole being applied to the sore which is covered with a small piece of plain lint kept moistened with mercuric lotion (1/1,000). This speedily facilitates healing.

In many cases when the sore is situated on the foreskin a circumcision is done and the whole sore removed. So far as our experience goes, it shews that the removal of the sore itself does not in any appreciable way effect the course of the disease.

Occasionally some very extensive sloughing has been met with; in some, most of the glans had been eaten away. The thorough application of the actual cautery, or pure nitric acid, invariably changed the condition for the better.

The most striking fact in the healing of local lesions is the general treatment by the arsenical compounds. On several occasions when the supply of "606" became exhausted, the cases did not receive any such treatment for weeks. At once one was struck, in going round the wards, to see the delaying of the healing of the sores. Again, when the new stock had been received, the rapid improvement after the injections were recommenced was equally, if not more strikingly, noticeable.

The ordinary syphilitic ulcerations of the skin are treated on the usual lines—antiseptics, mercurial ointments and drying powders.

Condylomata when extensive are cauterized and mercurial ointment applied. When small they are kept powdered with calomel.

Mucous patches on the lips, tongue, buccal mucous membrane, and tonsils are touched with silver nitrate (5i/5i) solution. Mouth washes of alum, potassium chlorate and potassium permanganate are also employed.

These applications to the local lesions all have their sphere of usefulness, but are of little or no avail unless the general treatment of mercury and "606" is actively pursued at the same time.

It has been noted that tertiary lesions, especially those deep ulcerations on the face near the nostrils and lips, heal with really remarkable rapidity when the "606" injections are given. Even in twenty-four hours a very marked improvement could easily be seen.

REACTIONS AFTER INJECTION OF "606," NEO-SALVARSAN, AND KHARSIVAN PREPARATIONS.

After injections of the arsenical preparations the reactions noted were: rigor, headache, vomiting, diarrhœa, and the presence of raised temperature on day of injection and following day.

These reactions are summarised in tables attached.

An examination of the results in these tables, which represent large numbers of injections, is shewn in the different series according to the nature of the preparation, the quantity of the medium, and the quality of the medium.

A very cursory look at them at once strikes one that the results, as expressed in reactions, are most varied, and that it is most unprofitable and would be a waste of time to compare them reaction by reaction.

In order to make an attempt to bring them to some sort of order, I have devised the plan to consider them in the following way—these reactions are all expressed as percentages, and most of them are compiled for series of 100 cases, some in greater numbers, none in less, except in 3a, 10 and 13.

By adding the sum total of the figures representing the rigors, headaches, etc., and dividing that total by the number of cases in each table which had a reaction, one gets a figure which may be said to express the average number of reactions in each series.

For example. In contrasting the results from the injection of kharsivan in 250 c.c. distilled water saline with those from the same

preparation in 250 c.c. boiled tap water saline, one notes that the result is in favour of the latter in the proportion of :—

	1st injections	1·66	against	2·28
Against in	2nd ,,	2·50	,,	1·50
In favour	Total ,,	1·71	,,	1·80

(*Vide* Tables—Series 5 and 14).

the discrepancy in the second injection results being due to the fact that of these second injection cases only two had reactions and they were both multiple reactions. In no case did reports come in from outside units of any men reporting sick after such second injection.

Another example. When kharsivan was dissolved in 100 c.c. distilled water saline as against 100 c.c. boiled tap water saline, the result shewed in favour of B.T.W.S. in the proportion of :—

1st injections	1·71	against	2·33	D.W.S.
2nd ,,	1·37	,,	1·90	,,
Total ,,	1·56	,,	2·27	,,

(*Vide* Tables—Series 6 and 12).

Another example. When kharsivan was dissolved in 50 c.c. D.W.S. as against 50 c.c. B.T.W.S., the result shewed in the proportion of :—

1st injections	1·43	D.W.S.	against	1·69 B.T.W.S.
2nd ,,	1·51	B.T.W.S.	,,	2·18 D.W.S.
Total ,,	1·68	,,	,,	1·93 ,,

(*Vide* Tables—Series 8 and 11).

Still another example. In contrasting the results from injections, when kharsivan was dissolved in 20, 50, 100 and 250 c.c. D.W.S., they shew in favour of 20 c.c. in the proportion of :—

1st injections	1·71,	against	1·90	50 c.c.,	2·33	100 c.c.,	2·28	250 c.c.
2nd ,,	0·95,	,,	2·18	,,	1·90	,,	1·50	,,
Total ,,	1·70,	,,	1·93	,,	2·27	,,	1·80	,,

(*Vide* Tables—Series 5, 6, 7, 8 and 9).

Again, in comparing these reactions from the injections of salvarsan and kharsivan in 250 c.c., we get these figures in favour of salvarsan in distilled water saline :—

1st injections	1·61,	against	2·28	K. in d.w.s.	and	1·66	K. in b.t.w.s.	
2nd ,,	1·27,	,,	1·50	,,	,,	2·50	,,	
Total ,,	1·39,	,,	1·80	,,	,,	1·71	,,	

(*Vide* Tables—Series 1, 2, 5 and 14).

It was impossible to carry out the experiments in detail with the salvarsan in the earlier part of the war, so we cannot compare results in lower dilutions of salvarsan with kharsivan.

In the tables one ought to note the number of cases where *no reaction* at all occurred in each class of injection. This is very important. By this is meant no rigor, headache, vomiting, diarrhœa, and no temperature over 100° F.

The total knowledge gained by the series of experiments is not very great, but what is gained is the fact that the reactions are really not much affected by the quantity or quality of the medium used, and that the experience here has been that one can use boiled tap water with safety and can reduce the quantity of the medium used with safety and even profit.

Perhaps these results will be of use to many members of the Society who are stationed abroad in the tropics where one can easily obtain the drugs by post, but where the provision of the distilled media may be impossible.

I know by personal experience the difficulty, in out-of-the-way tropical places, of obtaining distilled water, and hope that my results may point out a way of overcoming this.

The introduction of various remedial agents by intravenous injection is not by any means limited to the treatment of syphilis—for example, trypanosomiasis and kala-azar treated by antimony—and the practical results of my series of experiments may perhaps lead other men to follow up tropical diseases treatment by an extension in the use of such injections.

TABLE I.—Percentage of First Injections.

Series No.	Preparation and Medium.	Rigor.	Headache.*	Vomiting.*	Diarrhœa.	Temp. over 100° F. 1st Day.	Temp. over 100° F. 2nd Day.	No Reaction.	Severe and Multiple Reaction.	Highest Temp. Recorded.	Average Reaction Figure.
1	·6 Salvarsan, 250 c.c., D.W.S. ...	10·34	43·10 1·72	5·17	4·31	56·03	12·93	28·20	8·62	104·2 R H	1·83
2	·6 ,, 250 ,, ,, ...	14·37	29·34	11·67	3·29	54·49	8·08	25·44	5·68	104·0 V D	1·61
3	·9 Neo-Salvarsan, 10 c.c., D.W.S. ..	2·80	23·30	2·80	3·70	18·70	4·60	62·62	2·70	102·0 H V	1·51
†3A	·9 ,, 10 ,, ,, ...	0	0	0	0	0	0	100·00	—	—	0
4	·9 Neo-Kharsivan, 10 c.c., D.W.S....	11·76	28·23 3·52	9·41	8·23	34·11	11·76	41·17	10·58	104·0 V	1·75
5	·6 Kharsivan, 250 c.c., D.W.S. ...	25·92	38·27 11·11	30·86	19·75	49·38	6·17	20·98	28·39	104·6 R H V D	2·28
6	·6 ,, 100 ,, ,, ...	2·85	28·57 5·71	34·28 2·85	14·28	54·28	17·14	34·28	37·14	104·2 H	2·33
7	·6 ,, 20 ,, ,, ...	1·26	21·51 6·32	3·79	5·06	12·92	5·06	70·88	15·18	103·8 V D	1·71
8	·6 ,, 50 ,, ,, ...	0	7·02 5·40	10·81	10·81	32·43	16·21	45·94	16·21	102·8 H V	1·43
9	·6 ,, 50 ,, ,, ...	10·90	30·90 9·09	10·90	0	34·54	7·27	50·90	18·18	104·8 R H	1·90
‡10	·6 ,, 50 ,, ,, ...	0	0	0	0	0	0	100·0	—	—	0
11	·6 ,, 50 ,, B.T.W. ...	10·25	35·89 7·69	2·56	7·69	41·02	7·69	38·46	12·82	104·0 H V	1·69
12	·6 ,, 100 ,, ,, ...	2·63	26·31	15·78	18·42	28·94	15·78	36·82	13·15	104·0 H V (2 Cases) R H	1·71
13	·6 ,, 100 ,, D.W.S. ...	0	11·12	0	0	0	11·12	86·66	—	102·2 H	1·71
14	·6 ,, 250 ,, B.T.W. ...	0	46·00	12·00	2·00	32·00	8·00	40·00	6·00	102·4 H V (2 Cases) H D	1·66
15	·6 ,, 100 ,, D.W.S. ...	0	36·00 3·00	13·33	0	30·00	10·00	50·00	16·66	102·6 H V	1·78
16	·6 ,, 100 ,, ,, ...	2·70	48·64	18·91	0	32·43	5·40	43·24	18·91	102·4 R (2 Cases) H V	1·89
17	·6 ,, 100 ,, ,, ...	0	23·80 9·52	4·76	0	23·80	4·76	71·42	9·42	104·0 (Sev. H)	1·96

* A second figure in these columns means that that percentage had severe headache and vomiting.
† Only 17 injections in this series. ‡ Only 6 injections in this series. R = Rigor. H = Headache. V = Vomiting.
D = Diarrhœa. This Table refers to 100 injections or more, except Nos. 3A, 10 and 13.
D.W.S. = Distilled Water Saline. B.T.W. = Boiled Tap Water Saline.

TABLE II.—Percentage of Second Injections.

Series No.	Preparation and Medium.	Rigor.	Headache. *	Vomiting.	Diarrhœa.	Temp. over 100° F. 1st Day.	Temp. over 100° F. 2nd Day.	No Reaction.	Severe and Multiple Reaction.	Highest Temp. Recorded.	Average Reaction Figure.
1	·6 Salvarsan, 250 c.c., D.W.S. ...	0	0	0	0	0	0	100·00	0	0	0
2	·6 ,, 250 ,, ,, ..	1·44	8·17	6·73	0·48	27·88	0	64·90	0·48	103·0 Nil.	1·27
3	·9 Neo-Salvarson, 10 c.c., D.W.S. ...	0	0	2·30	0	0	2·30	95·34	—	104·0 Nil.	0·92
3A	·9 ,, 10 ,, ,, ...	0	0	0	0	0	0	100·00	—	—	0
4	·9 Neo-Kharsivan, 10 c.c., D.W.S. ...	0·91	18·34 7·33	0·91	11·00	3·66	2·75	71·55	11·92	101·4 H +	1·29
5	·6 Kharsivan, 250 c.c,, D.W.S. ...	2·18	19·67 3·82	13·66	10·38	19·12	1·09	55·73	10·38	103·6 V (2 Cases) V	1·50
6	·6 ,, 100 ,, ,, ...	0	4·61	4·61	0	6·15	4·61	90·76	4·61	103·0 V	1·9
7	·6 ,, 20 ,, ,, ...	0	4·76	0	0	0	0	95·23	—	100·0 H	0·95
8	·6 ,, 50 ,, ,, ...	0	12·69	7·93	1·58	6·34	6·34	84·12	9·32	101·0 H	2·18
9	·6 ,, 50 ,, ,, ...	0	2·22	0	0	0	2·22	97·77	—	- -	2·22
10	·6 ,, 50 ,, ,, ...	0	0	0	0	0	0	100·00	—	-	0
11	·6 ,, 50 ,, B.T.W. ...	1·63	6·55	6·55	0	1·63	3·27	86·88	3·27	101·0 —	1·51
12	·6 ,, 100 ,, ...	0	17·74	3·22	3·22	8·06	4·83	72·58	—	101·0 D	1·37
13	·6 ,, 100 ,, D.W.S. ...	0	0	0	0	0	0	100·00	0	—	0
14	·6 ,, 250 ,, B.T.W. ..	2·00	4·00	2·00	0	2·00	0	96·00	4·00	101·4 R H	2·50
15	·6 ,, 100 ,, D.W.S. ...	1·42	2·87	1·42	1·42	4·28	0	92·85	—	100·4 D	1·63
16	·6 ,, 100 ,, ,, ...	0	3·17 1·58	1·58	0	0	1·58	95·23	3·17	100·4 —	1·26
17	·6 ,, 100 ,, ,, ...	0	0	0	0	0	0	100·00	—	100·0 —	0

* A second figure in the headache column means that that percentage had severe headache.

R = Rigor. H = Headache. V = Vomiting. D = Diarrhœa.

This Table refers to 100 injections or more, except Nos. 3A, 10 and 13.

TABLE III.—Percentage of Total Injections.

Series No.	Preparation and Medium.	Rigor.	Headache. *	Vomiting. *	Diarrhœa.	Temp. over 100° F. 1st Day.	Temp. over 100° F. 2nd Day.	No Reaction.	Severe and Multiple Reaction.	Highest Temp. Recorded.	Average Reaction Figure.
1	·6 Salvarsan, 250 c.c., D.W,S. ...	10·15	42·73 1·70	5·12	4·27	5·55	12·82	28·20	8·54	104·2 R H	1·12
2	·6 ,, 250 ,, ,, ...	9·40	21·21	9·77	2·21	46·30	4·98	40·03	3·69	104·0 V D	1·39
3	·9 Neo-Salvarsan, 10 c.c., D.W.S. ...	2·00	16·60	2·60	2·60	13·30	4·00	72·00	2·00	102·0 H V	1·47
3A	·9 ,, 10 ,, ,, ...	0	0	0	0	0	0	100·00	—	—	0
4	·9 Neo Kharsivan, 10 c.c., D.W.S. ...	5·67	22·68 5·67	4·63	9·79	17·01	6·70	58·24	11·34	104·0 V	1·57
5	·6 Kharsivan, 250 c.c., D.W.S. ...	9·46	25·37 6·06	18·93	13·25	29·46	2·65	45·07	15·90	104·6 R H V D	1·80
6	·6 ,, 100 ,, ,, ...	1·00	13·00 2·00	15·00 1·00	5·00	23·00	9·00	71·00	16·00	104·2 H	2·27
7	·6 ,, 20 ,, ,, ...	1·00	18·00 5·00	3·00	4·00	11·00	4·00	76·00	12·00	103·8 V D	1·70
8	·6 ,, 50 ,, ,, ...	0	18·00 2·00	9·00	5·00	16·00	10·00	70·00	12·00	102·8 H D	1·93
9	·6 ,, 50 ,, ,, ...	6·00	18·00 5·00	6·00	0	19·00	5·00	72·00	10·00	104·8 R H	1·42
10	·6 ,, 50 ,, ,, ...	0	0	0	0	0	0	100·00	—	—	—
11	·6 ,, 50 ,, B.T.W. ...	5·00	18·00 3·00	5·00	3·00	17·00	5·00	68·00	7·00	104·0 H V	1·68
12	·6 ,, 100 ,, ,, ...	1·00	21·00	8·00	9·00	16·00	9·00	59·00	5·00	104·0 H V (2 Cases) R H	1·56
13	·6 ,, 100 ,, D.W.S. ...	0	6·66	0	0	0	6·66	93·33	—	102·2 H	1·90
14	·6 ,, 250 ,, B.T.W. ...	1·00	25·00	7·00	1·00	17·00	4·00	68·00	5·00	102·4 H V (2 Cases) H D	1·71
15	·6 ,, 100 ,, D.W.S. ...	1·00	13·00 1·00	5·00	1·00	12·00	3·00	80·00	5·00	102·6 H V	1·75
16	·6 ,, 100 ,, ,, ...	1·00	20·00 1·00	8·00	0	12·00	3·00	76·00	9·00	102·4 R (2 Cases) H V	1·83
17	·6 ,, 100 ,, ,, ...	0	10·00 4·00	2·00	0	10·00	2·00	88·00	4·00	104·0 H	2·33

* A second figure in these columns means that that percentage had severe headache or vomiting.

R = Rigor. H = Headache. V = Vomiting. D = Diarrhœa.

This Table refers to 100 injections or more, except Nos. 3A, 10 and 13.

Dr. G. PERNET: As none of the military men present are coming forward, I should like to say a few words as a civilian. I have been very greatly interested in Capt. MCGRIGOR'S paper, and I should like to congratulate him upon it. For many years I have used grey oil, and I have written on the point many times.*

There is one point I should like to emphasize, and that is, the great advantages military surgeons have over civilian practitioners. They deal with patients who are in the prime of life, selected individuals: and, in the second place, they have them under complete control. In hospital practice, we have no such control; patients come one day and follow up the treatment for a little while, and then they do not turn up again. It would be impossible to get excellent tables, like those presented, worked out in the ordinary general hospitals in London.

One point about salvarsan is that it whitewashes patients almost too well. In civil hospitals, they get rid of the ulceration and rashes rapidly by such means. Unfortunately they do not always turn up again, and you cannot follow up the treatment. The result is that in many of these cases, from the very fact that the treatment has improved them, really you are indirectly doing them an injury by letting them think that all is right, so that they do not follow up the treatment. The other day a woman turned up: she had broken down gummata about the left knee and on the right thigh. I found she had been in hospital four years previously, had had one injection of "606," and had never had any other treatment for her syphilis, but had been running about loose ever since. That is where the military surgeons have a great advantage over us. They collect their figures through men who are also under discipline, and the observations are regularly maintained day by day. For that reason, such tables as those which Capt. MCGRIGOR has given us are of great importance as guides in the treatment of syphilis.

I noticed there were few cases of ordinary chancroids—124 compared with much larger figures for syphilis and so forth. In the London hospitals, for instance, it is extremely rare to see chancroids. Directly you get people together (international exhibitions) then chancroids increase. In every case of chancroid, one must keep a sharp look-out

*PERNET: The treatment of syphilis, with special reference to intra-muscular injections, *British Medical Journal*, vol. I. 1907. The intra-muscular treatment of syphilis, *Lancet*, vol. II. 1909.

for the possibility of mixed infection, and syphilis developing later on.

Another point that struck me about Capt. McGrigor's cases is the absence of iritis. Syphilitic iritis is not very common as far as my experience goes—I only see it occasionally. It is instructive to find from the figures given in the paper that no single case of iritis or other ophthalmic complication has occurred.

The cases with the albumen in the urine are instructive, because it shews that syphilis is not infrequently complicated by specific albuminuria. There is a difficulty in civilian practice with patients who have had nephritis before contracting syphilis. Then you have to keep your hands off salvarsan.

Capt. C. H. Mills: I would like to say a few words in the discussion upon Capt. McGrigor's very interesting and detailed report of his work at the Connaught Hospital, Aldershot. For the past sixteen months I have been in charge of the Syphilis Wards at Rochester Row Military Hospital, and am glad of this opportunity of being able to compare the results obtained in the employment of the new organic arsenic preparations at the two hospitals.

One of the first points that struck me in this report was the extreme ease with which the diagnosis was arrived at in the great majority of cases. This was not my experience. So many have been the cases at Rochester Row in which the primary sore has been anything but typical, that I have made it a routine to arrive at a positive diagnosis only by detecting the *S. pallida* by the dark-ground illumination. I would say, without looking at statistics, that the proportion of chancroids to the syphilis chancre has been even higher in my cases, and that masked mixed infections are also very frequent. Only by the use of the dark-ground illumination as a routine can time be saved in cases which would otherwise have to be kept under observation—free from local antiseptics possibly for weeks. It is a simple matter to decide that the chancre is definitely syphilitic when typical, but it is extremely difficult—usually impossible—to decide that a sore is definitely non-syphilitic, when relying purely upon its clinical characteristics. This is especially the case when so many have had local antiseptics applied; and so I urge the importance of the dark-ground examination—whether from the chancre, gland puncture, or blistered suspicious rash—otherwise one

must perforce sit down and watch for possible syphilitic manifestations for perhaps weeks. The WASSERMANN tests in early suspected syphilis, if negative, are valueless.

When the chancre is typically indurated, or when the secondary manifestations are evidenced in abundance, further investigation is needless. In tertiary cases we always check the diagnosis with the WASSERMANN test. Another point in Capt. MCGRIGOR'S paper is that no appreciable difference in the reaction is produced when using boiled water instead of distilled for the medium in the arsenical preparations. Were this to be employed indiscriminately throughout the country, I am sure that in many instances serious reactions would occur. It had to be abandoned at Bulford, there being wide variations in the impurities of different water supplied, the salts in some possibly altering the chemical composition of the drug employed. Again, on hearing the very slight reaction produced in these cases, the civilian practitioner could very easily form an erroneous impression.

It is a recognised fact that soldiers tolerate—say, an injection of a drug like kharsivan—very much better than would the average type of patient one meets with as out-patients. To administer an injection of kharsivan to an emaciated pauper, and only retain him in bed for four hours would be asking for trouble.

I did not hear much mention in the paper of tertiary cases nor of cerebral, or tabetic cases; we get a fair proportion of these. My experience has been, especially in the latter types, that one should never put them right away on salvarsan. We have all met with, or heard of, cases of cerebral-syphilis in which there has been an alarming increase of symptoms, even culminating in death, following upon intraveneous injections of the organic arsenics. My explanation is that a HERXHEIMER'S reaction is produced in an artery or arteries, already almost occluded by syphilitic endarteritis, thereby bringing about its total occlusion, and depriving an area of already impoverished brain of any blood supply at all. I always put a cerebral-syphilitic or tabetic on mercurial inunctions and pot. iodid. for at least fourteen days, to promote an absorption of the small round cell infiltration in the arterial walls before commencing "606" treatment.

We are at present working upon a series of tabetic cases by giving intrathecal injections of mercurialised serum combined with the usual

systemic treatment, and further trying salvarsanised-mercurialised-serum. This we prepare by drawing off sufficient blood to give 30 c.c. of serum in a patient who has previously had "606" administered. To the serum we add 1/25 of a grain of hyd.-perchloride. The albuminate forms at first, but can be made to redissolve. This fluid, consisting of salvarsanised serum, plus antibodies, plus mercury, is injected intrathecally at weekly intervals, three injections being given.

The chief difficulty is to get cases in the early stages; most of them have gone too far to hope for anything more than to bring about an arrest of the degenerative processes. At present I have got seven cases that I have subjected to this treatment, and in every case I can say that I have been very pleased with the results, the symptoms being definitely relieved, even should this only prove to be temporary. Of course, one had to remember the withdrawal of cerebro-spinal fluid will often do this. One case of tabes with perforating ulcer has done very well. The rectal and bladder crises have cleared up, and the ulcer itself—always a pretty good test of a treatment—is now practically healed. Another case with a hypertrophic Charcot's hip, which was extremely painful—a rare symptom—is now quite painless, and the effusion greatly diminished.

Concerning Dr. PERNET'S enquiry with regard to the intra-muscular injections of mercury, I think this is the most satisfactory way of giving mercury to soldiers. One knows exactly *how much* the patient receives, and *when* he receives it. Years ago they were given pills to take, and, I am told, as a result that the drains of the hospital became blocked with pills, the men never even taking them off the premises. I do not think there are any other points I can think of now. Most of the figures seem to compare very well with my experience at Rochester Row. I did not notice whether Capt. MCGRIGOR had given many injections of neo-kharsivan. The worst reactions that we have had occurred with this drug, and we have now abandoned it. We have had two deaths following the employment of this drug, in each instance pneumonia set in at the finish. The symptoms developed as a profuse exfoliative dermatitis accompanied by intense jaundice. In one case I performed a post-mortem examination. The liver and spleen were engorged and swollen, and there was a marked hæmorrhagic pleurisy. Both cases were hypostatic. There were also petechial hæmorrhages in the meninges. The other case was transferred to another hospital.

We find galyl by far the safest of the new arsenical compounds, and very efficacious clinically. I have not yet seen herpes develop after its administration, which is an extremely common occurrence after kharsivan. I consider that many of the reactions noticed with these drugs only occur when there is a risk of the solution being too acid. None of them seem to develop with an alkaline solution which, of course, galyl gives.

Dr. T. P. Beddoes: With regard to intravenous injection of "606" and alternatives, no doubt there is a certain amount of difference between treating robust soldiers and treating the average class of patient one comes across in private practice and non-syphilitic cases with injections other than "606." With regard to preparation, an anxious patient takes no food at all for some time before, and in that condition has a greater tendency to vomit. Patients injected in the morning should take just a small breakfast—a cup of weak tea and some dry toast. No heavy meal, but always a light one.

The next point is in the binding of the limb. Capt. McGrigor uses a bandage tourniquet, which he ties with a half twist, and then pulls that off. If he has had one experience as I had: somebody else pulled off the bandage and jerked out the needle; no other vein could be found in the arms or hands, but fortunately one was found at the ankle. That is an experience one does not wish to repeat. In most cases it is better to search for a vein in every possible position before cutting down on one at the bend of the elbow. With pneumatic pads there is a certain amount of trouble. To distend the vein I use a broad rubber bandage, fastened with a safety pin, running the safety pin through the bandage but not fastening it. This gives a good hold, and can be pulled off with one finger. This, I think, is the best way; with the half hitch you are liable to get the needle jerked out.

Then Capt. McGrigor says he is satisfied when he feels the needle is in the vein. It strikes me there is a certain amount of risk about that. You may be sure if you have a large vein—but, take a small vein. It is, I think, desirable to have the reservoir lowered below the level of the patient, and see the blood at the first window, the one next the needle. As to Y-shaped arrangements: all these Y-shaped arrangements are not as convenient as a single receptacle, and you cannot so easily watch

whether it is filled or not as when you have a narrow receptacle. Secondly, it means a complicated arrangement of taps. Now, if the receptacle is fixed by a hook on to various pegs—the handles of drawers do extremely well for this—you can raise and lower it much more easily than with a Y-shaped tube. The one I use is narrow below, with a funnel-shaped upper opening. You can tell more easily when the contents are falling, there is no risk of spilling it, and you can raise and lower it with one hand. Then you keep on filling it until your salvarsan solution is finished. Then it is filled with saline, and when the fluid at the first window is clear the needle is withdrawn.

Then the suggestion, when using concentrated solution, as to feeling the needle in the vein. There is a certain risk in that—it may have passed through the vein. But if the syringe, with the solution and needle attached is put into the vein, and the piston drawn back, if the needle is in the vein the blood is seen in the syringe and the solution is then at once injected; to put the needle into the vein and afterwards attach the syringe to it, is, I think, liable to cause a certain amount of movement which may drive the needle through the vein; and although it may be a minor point, and may not occur in hospital work as in private practice, it seems, after seeing and trying both methods, best to fix the needle to the syringe before puncturing.

Dr. R. A. O'Brien: I am afraid I have not very much to say on the matter. I had the duty of testing kharsivan when it was first made; it was rather a difficult matter, as very little experimental work had been done in England on these later organic arsenical preparations, and careful search of Ehrlich's writings did not reveal in detail the criteria actually demanded by him. Of course, salvarsan theoretically is a chemical preparation and has a definite formula, and, therefore, every hundred samples of salvarsan should give technically the same analysis. As a matter of fact they do not. There is a considerable variation between individual samples. The arsenic content may vary considerably and that made the difficulty of testing much greater. One could not in the earlier stages rely on chemical analysis of these drugs. One had to test them on every laboratory animal available; we tested also with syphilitic rabbits. Mice infected with trypanosomes were used for testing every batch in the earlier days, but further details of testing will not interest you.

It is interesting to know that many thousands of injections of kharsivan have been given. One knows that some batches have undoubtedly produced more reaction than others. It was very difficult to get comparative statistics as to the reactions caused by different batches of the drug, and on enquiry as to how the distilled water was made we found that, although distilled water saline was used in most cases, the provision of satisfactory distilled water was in some instances definitely defective. Distilled water was perhaps made up by the dispenser, and used day after day. I know of two instances where the medical man who injects insisted on getting a glass still and redistilling the water himself. The second distillation takes place on the day of the injection. His results were remarkably good, reactions being rare. It seems to me from observation of such statistics and from the report on venereal diseases just published, that intense care should be taken to have satisfactory saline. As Capt. McGRIGOR points out, people on the outskirts of the Empire cannot get doubly distilled water saline, so they have to do the best they can. Where opportunity offers, it seems to me one is taking a very much less risk by using distilled water saline.

Mr. J. CANTLIE: I am sure you will agree with me in thanking Capt. McGRIGOR for a most instructive paper. We do not often get a paper of such completeness. We have had the absolute details given us—nothing is left to the imagination; so that a man who had never given a salvarsan injection before could understand how to do it readily. It is very interesting to find that an arsenical preparation (salvarsan) by itself is not so efficacious as when it is combined with mercury, and *vice versa*. The idea of one drug one disease is slowly but surely dying out; we have tried it for the last thirty years, but scientific research is stamping out a phase of medical practice of which we have good reason to be ashamed. We have tried to cure, of recent years, malaria with quinine alone; we tried to cure trypanosomiasis with antimony alone, and failed; We have recently added another to the list, viz., the cure of dysentery by a few injections of emetine, to the exclusion of the other ingredients of ipecacuanha, and it is not wholly satisfactory. Malaria was never treated by our predecessors with quinine alone; in the malarial districts of England the "fever powders" contained arsenic, opium and mercury in addition to quinine. The mercury was sometimes given beforehand as a

calomel pill; but mercury remains in the system for a few days before elimination, so, whether given before or with the powder, the effect was the same as a parasiticide when acting in combination with the other drugs. The question of the one drug one disease is being hit hard in the most scientific manner. Chronic malaria to-day is best treated by the combination mentioned above as the "fever powders." Warburg's tincture (without the quinine) has been in existence and widely used as the "fever mixture" since the days of Mithriades, some four thousand years ago, and it retains its position as a remedy. It is not of the one drug one disease category, for it contains over twenty ingredients—a tribute to the plurality of drugs in treatment, which has been supported by modern research on every hand.

Many points in Capt. McGrigor's paper are excellent. The detail about raising the skin over the vein when the hypodermic needle is being inserted is a very wise precaution, for if the skin is at all tough, and the needle is pressed forcibly through, it is well to remember that beneath the median-basilic vein the brachial artery is in close juxtaposition; and as by the lancet, in days gone by, the artery was occasionally wounded when the vein was opened for venesection, so the hypodermic needle may find its way into the brachial artery unless Capt. McGrigor's precaution is taken.

Dr. Pernet aptly referred to the differences as regards observation and control of patients in civil and military hospitals, to the great advantage of the latter. In civil hospitals, and in private practice, patients are under but little control as regards attendance, and subsequent histories are difficult to obtain. In military practice the reverse is the case, for as long as a man remains in the Army his medical sheet gives a continuous account of his illnesses and condition. We, therefore, have to look to our military confrères for much enlightenment in matters of this kind.

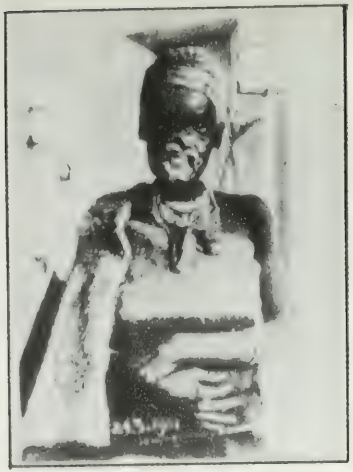
The one great objection to salvarsan treatment is that, with the rapid disappearance of signs and symptoms, the patient imagines he is cured by a few injections, and often refuses to take the treatment at a later stage, when the inevitable evidence of the disease returns. It is the same with the bath treatment at Aix and other places. The immediate signs and symptoms disappear, and when they return, as they invariably do if no further treatment is kept up, the patient refuses to believe that he is suffering from syphilitic recurrence, because he says he was completely

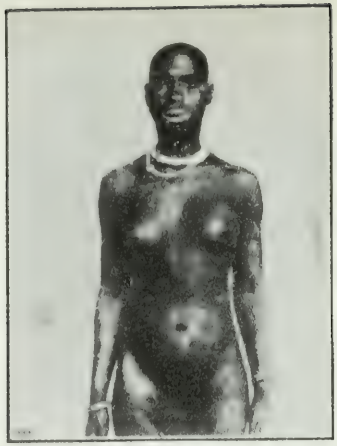
cured of that long ago by six weeks at Aix, etc. Many a man refuses anti-syphilitic treatment to the detriment of his health and that of his family, should he have children. Capt. McGRIGOR has assumed the *rôle* of teacher, and has shewn that he is proficient in that rare faculty. This paper should be in the hands of every practitioner, so that he can have no excuse in not undertaking the treatment advocated by Capt. McGRIGOR with so much precision and acumen.

Capt. H. J. McGRIGOR: In reply to Dr. PERNET, I quite appreciate the fact that our cases in the Army are selected, healthy young men, except a few broken down old men, and this makes a great deal of difference in the treatment of the disease, and even more so in the following up of the cases. We have our patients under control, and can get them at any time to attend for further treatment in case of relapse. With regard to his remarks about venereal sores, this paper deals with syphilis only, but I may state that during the period this paper covers I have not seen any cases of chancroid. Capt. MILLS referred to examining all the cases by means of the dark-ground illumination. As I have said in the paper, very few of our cases needed anything in the way of diagnosis beyond a careful clinical examination. Indefinite cases are examined by the microscope as a matter of routine. Regarding men shewing no reaction up to four hours after injection, I fear I did not make it quite clear in the paper that these men who come to hospital for the second and third injection, as a rule do not react after that period of time. It is well recognized that the reactions are much less in degree after the second or third than after the first injection. He also remarked on the difference of composition of tap water in different localities. To a large extent, any interference with the "606" would be by lime and carbon dioxide. The most of these are got rid of by the two boilings in the preparation of the saline.

Dr. BEDDOES did not quite seem to grasp the meaning of the single turn of the tourniquet on the arm. The way I described prevents any displacement of the needle, for it is steadied all the time by the right hand, while the left hand clears away the rubber band by a gentle pull on the long end. With respect to his plan of drawing in some blood into the syringe when giving neo-preparation, or into the end-piece in the gravity apparatus, there is always the possibility of the blood clotting

in and blocking up the needle, necessitating its withdrawal and re-entry. In reply to Dr. O'BRIEN, I may state that adverse reactions were not at all marked after the use of kharsivan or neo-kharsivan. After 1,285 kharsivan injections, only two cases reacted severely: one had an extensive dermatitis of both hands, which cleared up in 72 hours; and the other developed an arsenical neuritis of both legs, leading to paraplegia, from which he recovered in six weeks. Many cases did not react at all. This makes one doubt whether the reaction is much influenced by the medium in which the drug is administered. Labial herpes is not uncommon. The CHAIRMAN emphasized the importance of combining the use of arsenic and mercury in the treatment of syphilis, and also the treatment of malaria by means of arsenic and quinine, in this latter disease, especially in chronic cachectic conditions, a small dose of salvarsan can be usefully employed. Recently I have seen several patients treated with kharsivan alone, no mercury being given at all. Their condition, compared with others treated with kharsivan and mercury, was an object lesson in "how not to do it."





Illustrations to accompany Dr. H. Bayon's Paper.

THE TREATMENT OF SYPHILIS IN AFRICAN NATIVE TRIBES AND AMONG NATIVE WORKERS ON THE RAND.

By Dr. H. BAYON.

Several attempts have been made to cope with the spread of syphilis among native tribes, at different times, by various Colonial Governments. The results have not always been commensurate with the effort and expense. The reasons are multiple and complex, but probably culminate in the fact that, when dealing with great numbers, and with an easily acquired disease, curative measures must be accompanied by prevention to achieve a lasting result. In addition, no system of treatment will be popular among African Natives* which is not only efficacious but also promptly evident in action. A painful treatment, even one that is dangerous, will not deter raw natives, if the medical man has their confidence, as long as evidence of cure is visible within a few days. Prolonged courses of treatment, however efficacious they may prove in the end, are extremely difficult to carry out. This we know from experience in the treatment of sleeping sickness with atoxyl or its substitutes.

The prevalence of syphilis among raw natives, living far from contact with white men, has often been exaggerated. Of course, differences exist, even between tribes living in contiguous districts, but, as a rule, one in twenty would be a fair proportion of clinically recognizable syphilitics among pagan natives. The proportion is certainly much higher among semi-civilised natives, or natives who work for white men or live in townships; as many as a third may shew symptoms of the disease, or admit infection.

It may be stated that all the more advanced Bantu tribes, such as the Zulus, the Basutos, the Mxosa, the Baganda, etc., are quite capable of distinguishing syphilis and its primary and secondary symptoms from

* By African Natives I mean Bantu, which is the predominant coloured race in Africa at the present time.

any similar affections, in fact, it is astonishing how intelligent natives will unerringly differentiate the majority of skin eruptions from each other. Where knowledge fails it is in the recognition of the connection between primary sore and tertiary symptoms. Gummas are usually confused with sores or swellings of non-specific origin; on the other hand, if a Bantu says he has had syphilis, the statement can be considered to be correct.

Treatment with mercury and iodides was hardly applicable on a large scale to raw natives, living scattered over a wide district. A course of treatment which had to be continued for a year at least, with regular intervals, does not appeal to the imagination as a miraculous European medicine; many natives are persuaded they can achieve as much with their herbs and charms.

Extensive experience at the Rietfontein Lazaretto in South Africa has, however, proved that anti-syphilitic arsenical preparations can be easily injected in concentrated form to hundreds of cases rapidly, with a very low accidental mortality, and with the well-known prompt, if not always lasting, effects which have been described in the previous paper this evening.

Taking, therefore, into consideration these two important and favourable factors, a facile and reliable method of treatment and native talent in the diagnosis of the earlier stages of syphilis, it appears that renewed attempts to keep an important race poison in check might be attended with some success. The price of the drugs appears, however, to be a serious obstacle. It is possible that anti-syphilitic arsenical preparations will become cheaper in the course of time, but it should not be forgotten that even the raw native is quite willing and capable of paying for any medicine, the properties of which he recognizes. Poor people, in our sense of the word, do not exist in Central Africa or South Africa; there are no natives who do not know when and how they will get their next meal, and lack shelter and a bed. During the prevalence of a famine, circumstances are otherwise, then all suffer; but in years with a normal crop, raw natives are quite able to raise relatively considerable sums for any object they fancy, no doubt also for recognized treatment. I admit there are some qualifications to this statement, but a discussion of the subject would lead me far from the medical standpoint.

It is remarkable that, as a rule, the pagan native does not seem to

suffer from the terrible mutilations due to untreated tertiary syphilis. These mutilations, as you will see, are not unknown in South Africa, whose natives on the whole are partially civilised. Neither does one meet general paralysis or tabes as a result of syphilis, though I have seen euphoria, expansive megalomania, sluggish pupils and progressive dementia in Uganda as a result of trypanosomiasis.

Another feature of native syphilis is the presence of little boys of 7 to 9 years of age among the individuals infected and the outbreak of accumulated contagion in families, some of the cases being due to apparent indirect extra-genital transmission, as shewn by the following example from Bugalla on the Sesse Islands:—

A young girl of 18, from another island, came on a visit to relations; she infected her host and his little son (*æt.* 10 to 12). The former gave the disease to his wife; her little baby developed syphilitic rhagades of the mouth; the elder daughter, a girl about 14, also developed a syphilitic rash; no primary sore could be detected, and sexual intercourse was denied. Five cases all told.

Cases in which a typical secondary rash develops without the presence of a primary sore are met with from time to time.

Abortion appeared to me to be common among the Baganda; how much was due to syphilis is very difficult to state; malaria, spirochætosis, native medicines and customs also play a part in bringing about miscarriages.

There is no gainsaying that, on the whole, syphilis is not as medically important as malaria, sleeping sickness, or other diseases whose prevalence varies a deal in different districts—in any case, as far as the raw native is concerned—still, recent advances in therapeutics render it possible to deal effectively with any localized high ratio of infection, possibly on a self-supporting basis.

The problem how to deal with syphilis among natives working for Europeans on estates or mines is a much more important one, not only because the disease is much more widespread among such natives, but also because it appears incumbent upon the employers or their representatives to look after the workmen's welfare; in addition, there is the danger that native servants may infect by contagion Caucasian children entrusted to their care. In some parts of Africa this is by no means an imaginary danger.

In South Africa, an efficient system of hospitalization and treatment of syphilis has been in operation among the workers in the gold-fields of the Rand for several years, and I believe that it is as successful as any measure which is based on cure only, without the aid of prevention.

Treatment is compulsory, in so far as the men are brought in by the police after having been certified by the mine or district surgeon, but this is an easy task, as the natives are quite willing to be treated. The native workers on the Rand average about 200,000; of these, about 300 to 400 are constantly at the Rietfontein Lazaretto, about eight miles from Johannesburg. The lazaretto has at its head a medical superintendent, with two Caucasian dressers, a manager, a book-keeper, and a matron. The rest of the staff is Bantu.

Originally, treatment used to consist in inunction, and calomel injections; these were later supplemented by one or two intravenous injections of "606" or salvarsan, of which over 8,000 were made. Later, neosalvarsan in concentrated form was adopted, the solution being made with 7 c.c. of warm tap water in the tube containing the drug, aspirated into a small syringe, and injected intravenously on the spot. In this fashion, by preparing the veins beforehand, as many as twenty cases an hour can be injected. The injections are followed by inunction every third or fourth day, and, if considered necessary, calomel is injected intramuscularly. The whole course of treatment does not take over seven weeks, as a rule, though some cases may require a longer period before they can be declared free of any symptoms or danger of recurrence.

Arsenical preparations by themselves have not been found to bring about a lasting cure, and I am demonstrating photographs of a secondary rash developed after injection of 0·6 grammes of "606." The Medical Superintendent of the lazaretto, Dr. M. Mehliss, considers that though one or two injections of salvarsan are at times not sufficient to cure a syphilitic, yet the drug is an invaluable adjunct, which shortens treatment very considerably, and, moreover, enables one to deal effectively with many bad cases of tertiary and secondary syphilis, which at times reacted but slowly and incompletely to mercury alone. Knowing the rapid action of the arsenical preparation one can await the permanent results of mercurial treatment after the most alarming symptoms have been dealt with.

Accidental mortality, apparently due to the action of the drug on a

debilitated individual, does take place in single and rare instances. It is not unknown even when making use of mercurial injections alone, but in view of the definite and conclusive saving in life, limb and time which follows the use of arsenical preparations, one is certainly justified in taking the risk in the patient's own interest; in the same way one faces the danger of administering an anæsthetic, or, in fact, any time one employs any powerful therapeutic agent.

I mentioned that treatment is compulsory at Rietfontein; accordingly residence in the lazaretto is compulsory till the patient is cured in the opinion of the Medical Superintendent. Such is, however, the faith of the natives in the treatment they receive, that an escape or evasion is an unknown thing, though no special watch is kept and no elaborate fencing is employed. The men are well, if simply, fed, housed in big wooden sheds, and are only lightly occupied in weeding, tree-planting, etc., if at all. I should mention that the Medical Superintendent is a South African, speaks fluently several native languages, so that his local knowledge enables him to maintain order and peace in what might otherwise be a somewhat turbulent crowd, for tribal fights are not unfrequent on the Rand.

In the course of these remarks I have often made allusion to the lack of prophylaxis in dealing with syphilis. I believe that in the course of time the medical profession will have to consider venereal disease among natives from the same standpoint which has so successfully dealt with many other tropical diseases, that is by applying the wise old saw: "Prevention is better than cure."

LIBRARY NOTES.

Under this heading we propose to review recently published works sent us for that purpose, and a short notice of any other works presented to the Library.

Chaulmoogra Oil Treatment of Leprosy.—In Public Health Bulletin No. 75, of the United States Public Health Department, January, 1916,* Dr. GEORGE W. MCCOY, Director, United States Leprosy Investigation Station, Hawaii, and Dr. H. T. HOLLMANN, Acting Assistant Surgeon, write on the chaulmoogra treatment of leprosy. They state that the interest that has been shewn recently in the treatment of leprosy by the use of chaulmoogra oil by the hypodermic method has made it desirable to review the reports on the use of the drug, and to record their own experience with it. "According to CASTEL, the hypodermic use of the oil appears to have been proposed first by TOURTOULIS, of Cairo, who, in August, 1899, presented the method before the Academy of Medicine and the Dermatological Society of Paris. He used the oil in this manner for several years before reporting the results, which were favourable but could not be regarded as cures." CASTEL himself did not regard the method as one for routine employment; he reserved it for exceptional cases, at the same time calling attention to its disadvantages, and especially to the danger of fatty embolism (pulmonary), a complication which occurred in two of his cases.

UNNA, in 1900, used the oil both by the mouth and by injections, and claims to have had good results. [It was also used by the latter method at the Seaman's Hospital, London School of Tropical Medicine in the same year.]

ENGEL, who gained his experience in Egypt, agrees with the general opinion that the oil is the most useful agent we have; he recommends giving it in a purified form, known by the name of antileprol. LIE

* Treasury Department: United States Public Health Service. Public Health Bulletin No. 75, January, 1916. Studies upon leprosy, XXVIII.—Chaulmoogra oil treatment of leprosy by GEORGE W. MCCOY and HARRY T. HOLLMANN. Washington. Government Printing Office. 1916.

believed that remedy had an undoubted value; he also at the same time mentioned the danger of embolism after hypodermic use. HANSEN, on the other hand, failed to find any beneficial results from it and abandoned it. Others have found that given intramuscularly it causes great pain, and so have stopped giving it by this route. Lately, HEISER, in the Phillipine Islands, reports five apparent recoveries after its use. As regards McCOY and HOLLMANN'S only personal experiences in Hawaii, there is a record of the use of the drug as far back as 1886, and it has probably been used ever since. GOODHUE, in his annual report for 1912, remarked that "chaulmoogra oil was the most popular remedy"; while WAYSON says of it, "chaulmoogra oil still holds a good place in the treatment of leprosy; while no cures have resulted from its use, many cases are greatly benefitted."

The authors give their experience with the hypodermic use of the oil in 42 cases, 16 of which have received injections for periods varying from 10 to 17 months. The results were :—

Improved	10
Stationary	4
Progressive	2

while the remaining 26 had not taken the oil long enough to enable a judgment to be formed. The majority of the cases took the oil by the mouth at the same time that it was given hypodermically, and a number of them had carbon dioxide snow applied locally to the lesions. The dose found most suitable was a weekly injection of 5 cc.m. of a mixture containing 50 per cent. of the oil. Larger doses gave rise to such persistent infiltrations that they had to be discontinued. Some have given the oil alone hypodermically, but it is considered better to combine it in the form of mixtures. Two of these are given in the paper, namely (1) a formula given by JEANSELME, and (2) one devised by MERCADO and used by HEISER, in the Philippines.

(1)

Chaulmoogra oil, which has been washed with alcohol, filtered through cotton and sterilized at 100° C.... ...	1 part.
Guaiacol, 50 centigrams	1 part.
Camphor, 50 centigrams	
Oil of vaseline (vaseline sterilized and filtered), 5 grams	

(2) Chaulmoogra oil ... ... 60 c.cm.
Camphorated oil ... ... 60 ,,
Resorcin ... ... 4 grams.

Mix and dissolve with the aid of heat on a water bath, and then filter.

Complications attending the use of the oil are met with, and the authors had their share of these. Abscesses developed in five cases, three of which required opening and draining, two patients fainted after the injection, and five developed paroxysms of coughing within a minute or two after the completion of the injection. This was complicated in one case by rather severe circulatory depression. In this connection a case mentioned by MANSON in his book on Tropical Diseases (4th edition, p. 562) is referred to; here the patient died from what was suspiciously like fat embolism. [It was fat embolism, the patient, though perfectly healthy that morning, dying some minutes after the injection. At the autopsy, at which the present writer was present, no gross lesions were present that could have accounted for the sudden death.]

McCOY and HOLLMANN'S summary of the subject is as follows:—"Our personal experience leads us to the conclusion that most writers have reached—that the oil is helpful to many cases of leprosy, perhaps the majority.

"The hypodermic method of administration, while not free from disagreeable complications, seems to have given good results, and in view of the nature of the disease ought to be given a further trial. We are sure that the use of chaulmoogra oil as at present practised is not the solution of the problem of the therapeutics of leprosy."

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